

# *Anthyllis cytisoides* L. (Fabaceae), new to the Italian native flora

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## Abstract

We present the first finding of *Anthyllis cytisoides* L. in Italy. This western Mediterranean woody species was found close to the coastline on the southwest side of Mt. Argentario in southern Tuscany, on limestone rocks within a xerophytic garrigue community of the *Erico multiflorae-Rosmarinetum officinali* association. A description of the plant is given along with an original iconography and photos taken in the field. The reasons for considering this population of natural origin are briefly discussed, along with the possible causes of its wide disjunction from the rest of the species range.

## Keywords

disjunct populations, Fabaceae, Italian flora, Leguminosae, mediterranean plants, Tuscan phytogeography

## Introduction

The genus *Anthyllis* L. belongs to subfamily Papilionoideae (Legume Phylogeny Working Group 2017) and includes 25 species distributed in Europe, Western Asia and North Africa, southward to Ethiopia (Degtjareva et al. 2012; Mabberley 2017). These species are largely variable in habit and life-cycle, from woody shrubs to perennial, biennial or annual herbs, usually unarmed, rarely spiny. Morphologically, the genus is mostly characterized by the monosperm legume with membranaceous pericarp, enclosed in the calyx. Phylogenetically, it is included in the clade of tribe Loteae and is probably sister to the monotypic African genus *Antopetitia* A.Rich. (Degtjareva et al. 2012).



The Italian flora includes four species, *A. barba-jovis* L., *A. hermanniae* L. (with three subspecies), *A. montana* L., and the taxonomically critical group of *A. vulneraria* L. s.l., where some 15 infraspecific taxa have been recognized (Bartolucci et al. 2018).

*Anthyllis cytisoides* L. is a diploid woody species closely related to *A. terniflora* (Lag.) Pau and belonging to the core group of *Anthyllis* (Benedì 2000; Degtjareva et al. 2012). These two western Mediterranean species are not closely related to the central and Eastern Mediterranean woody species [*A. hermanniae* L. and *A. hystrix* (Willk. ex F.Barceló) Cardona, Contandr. & E.Sierra] and were therefore segregated in the separate subgenus *Terniflora* W.N.Tikhom. & D.D.Sokoloff (Tikhomirov and Sokoloff 1996). This subgenus was then reduced to section by Benedì (1998) in his treatment for *Flora Iberica*.

Based on current information, *A. cytisoides* is native to Northwestern Africa (Algeria and Morocco), the Iberian peninsula, including the Balearic islands, and southern France (Languedoc-Roussillon and Provence; Benedì 2000; Euro+Med PlantBase; Roskov et al. 2006). To our best knowledge, the species has never been observed in Italy (Bartolucci et al. 2018). During botanical fieldwork in southern Tuscany we discovered a small but presumably native population of this species, which is described here for its phytogeographical relevance.

## The new record

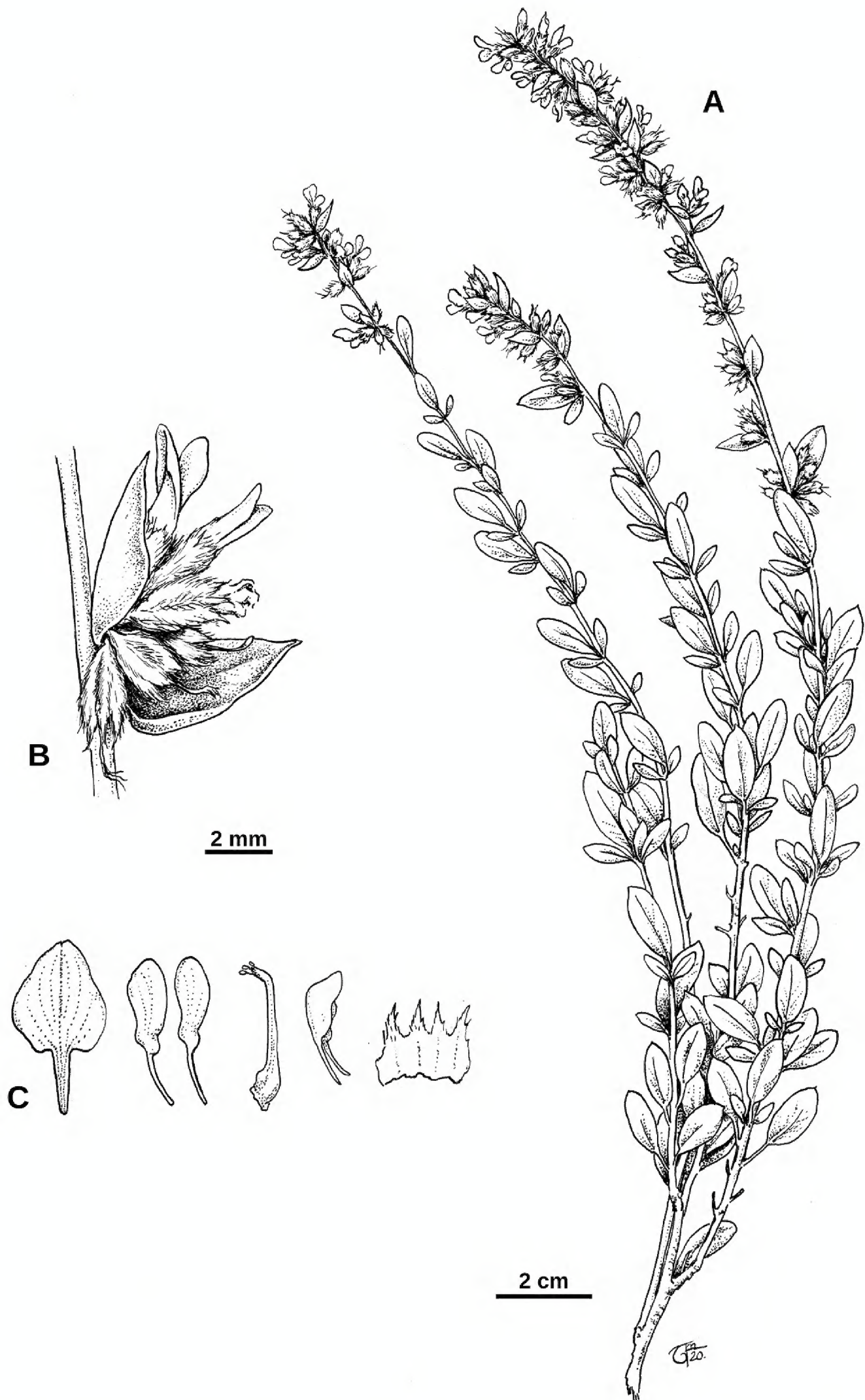
### *Anthyllis cytisoides* L., Sp. Pl.: 720 (1753)

**Note.** Italia, Toscana, Monte Argentario (Grosseto province), rocce calcaree nella gariga bassa a erica multiflora e rosmarino verso La Ciana fra Punta Avoltore e Punta di Torre Ciana (WGS84: 42°22.25'N, 11°09.98'E), 80 m, 23 May 2020, *F. Selvi & I. Bettarini* (Herb. Selvi no. 3975 in FI!).

**Description of the plant.** Nano-phanerophyte up to 60 cm, much-branched from a woody base; branches erect, unarmed, with whitish indumentum of short appressed hairs. Leaves softly pubescent, the lower mostly unifoliate, 1.8–2.5 × 0.7–0.9 mm, ovate-lanceolate, apiculate; petiole 8–9 mm long, slightly dilatated at the base and provided with two scale-like stipules of ca. 0.2 mm. Mid-cauline and upper leaves mostly trifoliate, with central leaflet petiolated, obovate-lanceolate, 1.3–1.8 × 4–6 mm, and lateral leaflets much smaller, 0.5–0.8 × 0.2–0.3 mm, acute at apex. Flowers grouped in 2–4 in subsessile fascicles arranged in a lax spiciform inflorescence up to 20 cm long, each fascicle inserted at the axil of ovate-lanceolate bracts, the lower often divided in two or three segments, pointed at apex, pubescent, nearly as long as long as flowers. Flowers ca. 10 mm, subsessile. Calyx villous-pubescent, tubular, 5–6 × 2–2.5 mm, with slightly obliquous mouth and very narrow teeth, these shorter than tube (2 mm), the upper slightly longer than the lower ones. Corolla yellow, with standard petal ca. 4.2 × 3 mm and wings ca. 1 mm longer than keel. Androecium sub-monoadelphous, with one stamen partially free. Legume 3–4 × 2 mm, monosperm, obovoid, apiculate; seeds 1.2 × 2 mm, reniform and smooth (seeds not seen, data from the literature).

**Iconography.** Figures 1, 2a,b.





**Figure 1.** Original drawing of *Anthyllis cytisoides* L. from Mt. Argentario, based on collection *Selvi* 3975 (original artwork by Laura Vivona) **A** branch with leaves and inflorescence **B** single fascicle of flowers with bract **C** dissected flower showing (from the left), standard petal, wings, stamens, keel and calyx teeth.





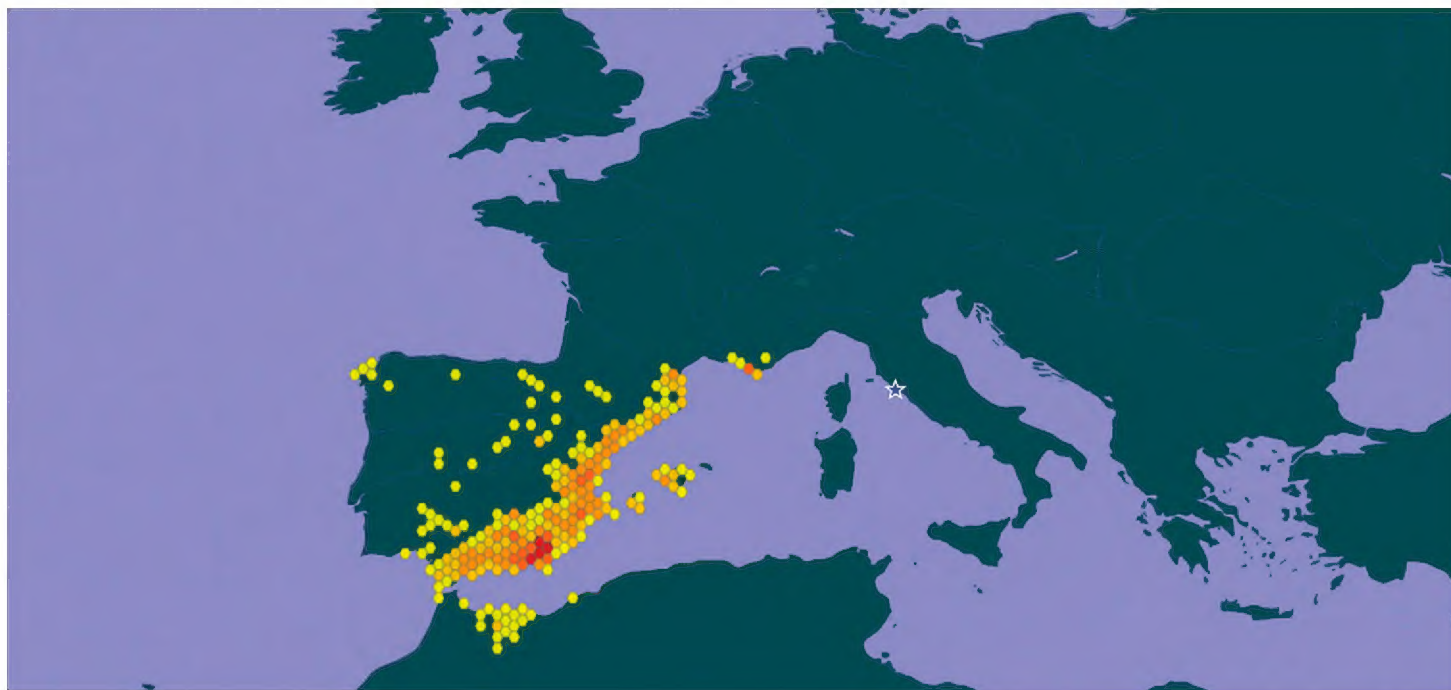
**Figure 2.** Whole plant of *Anthyllis cytisoides* in its natural habitat on Mt. Argentario (**A**) and particular of the inflorescence (**B**); photographs by F. Selvi, 23 May 2020.

**Locality, habitat and threats.** *Anthyllis cytisoides* was found on Mt. Argentario, a former island of the Tuscan Archipelago that became connected to the south Tuscan mainland during the Quaternary age by two sandy isthms (Lazzarotto 1993). The species was observed in a very narrow area (a few hundreds of square meters), at 80 m above the rocky coastline on the southern part of the massif, between Punta di Torre Ciana and Punta Avoltore, close to a steep, narrow valley descending to the sea, called Valle Lunga. The few individuals were growing on outcropping limestone rocks within a typical low garrigue of the *Erico multiflorae-Rosmarinetum officinali* (Horvat.) Trinajstić community. This is typical of the warmest and driest parts of Mt. Argentario with eroded slopes and rocky calcareous soil (Arrigoni and Di Tommaso 1997). The site was apparently natural, with no signs of recent human disturbance.

No incumbent threats to the population could be identified. However, its very small size exposes it to any stochastic or unpredictable event that may occur at the site. The main risk is probably collection by unaware people, considering that the plants are easily accessible from a dirt road and close to a panoramic point.

**Final remarks.** *Anthyllis cytisoides* appears new to the Italian flora, as no literature record exists that can document its presence over the national territory, even in historical times. This is supported by the study of herbarium collections in FI (!) and FIAF (!), all of which coming from France, Spain (e.g. Spain, Barcelone, Costas de Garraf, falaises argilo-calcaires, 16.05.1929, *F. Sennen* 7241; Balears, Palma à Cas Catala, garrigues, 12.06.1933, *F. Sennen* 8617) and Morocco (Kabila de los Santos, escarpe-





**Figure 3.** Distribution range of *A. cytisoides* (yellow to red dots show increasing frequency of records) and locality of its finding in Tuscany (asterisk; adapted from GBIF, <https://www.gbif.org/species/5352466>).

ments calcaires, 07.05.1931, *Sennen et Mauricio s.n.*; Beni-Bu-Yahi, montes Idbiren, 21.06.1932, *Sennen et Mauricio* 8392).

Biogeographically, the presence in Tuscany is noteworthy as it extends considerably to the east the range of this mainly western mediterranean species. In fact, the Tuscan population is quite isolated from the closest ones in southern France, that occur about 500 km to the west (Fig. 3). Concerning its origin, the possibility that its presence could not be natural seems to be excluded. The plant grows in a site with no signs of human disturbance, in the typical habitat where it is found in the main part of its range, e.g. low shrub or garrigue-like communities on rocky limestone soil or calcareous escarpments (Benedì 2000). Because of its severity and the competition by native species (mainly *Erica multiflora* L. and *Salvia rosmarinus* Spenn.), this kind of habitat is hardly colonizable by alien plants. In the third week of may, *A. cytisoides* was in full flower, suggesting its reproductive ability in the local environment. In addition, this species is not reported as a commonly cultivated plant and is not considered of particular ornamental value. As no tendency to become naturalized is documented, it is unlikely that the local population could have originated from plants escaped from gardens in the area.

Assuming that the population is native to Mt. Argentario, the question arises about the causes of such a wide disjunction from the rest of the species range. Two hypotheses can be offered. The population could be a remain of a formerly more continuous range along the coasts of the north Tyrrhenian basin, from south France to Liguria and Tuscany. More probably, it could be more recent and originated from events of long-distance dispersal mediated by overwintering birds with seasonal migration from north Africa to the north Mediterranean and rest of Europe. Many of these bird species are important agents of plant dispersal and have likely contributed to the homogenization of the floras of North Africa and the Mediterranean countries (Thompson 2005).



*Anthyllis cytoides* grows on a high slope facing the sea to the southwest, which may represent a suitable site for a first stop and rest of the migratory birds arriving from Africa and the southern parts of the Mediterranean. The fruiting calyx of this species is hairy-villous and both legume and seeds are small-sized, two traits that likely favor their attachment to the surface of birds and long-distance transport.

The finding of a woody species new to Italy on Mt. Argentario may appear unexpected, as this area is considered phytogeographically well-known (Angiolini et al. 2005). Since the XIX century, numerous botanists have studied its diverse flora and vegetation, some of which in relatively recent times (Baldini 1995; Arrigoni and Di Tommaso 1997). As observed by Rosati et al. (2019), however, this kind of findings in supposedly well-known territories show that field researches can still lead to significant progresses in our knowledge of the national floristic heritage, particularly rich in rare species, thus increasing the base of data for its long-term conservation.

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